Owner's Manual

Symetrix

SX201

Parametric EQ / Preamp

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This manual will not play in reverse.
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Ain't technology grand?

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1. Introduction

The Symetrix Model 201 EQ/Preamp provides studio quality equalization and notch filtering for line level balanced or unbalanced signals, as well as for low level unbalanced signals. Three fully parametric bands of equalization are provided, with +15dB boost and -30dB cut capability, allowing the SX201 to be used for both creative and corrective equalization. Overlapping frequency controls cover the audio range, from 16Hz to 20kHz. Bandwidth is continuously variable from .05 octaves (for deep notch filtering), to 3.3 octaves (for smooth tone shaping).

With its separate line and preamp inputs, the SX201 will handle nearly any signal level. The line level input provides both balanced or unbalanced terminations, while the preamp input is unbalanced. The line level input is intended for use with signals that have already passed through a preamplifier. The preamp input provides 30dB gain, and is intended for use with low level signals such as those from synthesizers, guitars, bass guitars, or electronic drums. The overall input level control allows the operator to set internal signal levels to match boost/cut conditions.

Parametric equalizers are so named because their operating parameters (characteristics) are variable. The SX201 is described as fully parametric because the center frequency, the bandwidth, and the amount of boost or cut, are all user adjustable.

1. Center frequency is defined as the frequency, measured in Hertz (Hz), that is at the center of the range of frequencies controlled by the equalizer.

2. Bandwidth is defined as the range of frequencies, measured in octaves or fractions of octaves, that are controlled by the equalizer.

3. Boost or cut is defined as the amount of increase or decrease, measured in decibels (dB), that the equalizer provides at the center frequency.

2. Using the SX201

Care must be exercised when using equalization. The general precautions are:

2.1 Beware Distortion and Noise

When a frequency or group of frequencies are boosted, the overall operating level is boosted as well. For example, 12dB of boost (no matter what the frequency) increases the SX201's output level 12dB. This kind of boost will reduce headroom by 12dB in every circuit from the SX201's own line driver to the last device in the signal chain (amplifier, tape machine, mixer, or what have you). Unless signal levels are very low to begin with, the SX201's input attenuator will probably have to be turned down to compensate for increased levels when the equalizer is used for more than 6dB or 8dB boost.

On the other hand, if the levels within the SX201 are too low to start with, using the equalizer for boost may increase noise that already exists in the signal to unacceptable levels. If levels are too low, reduce input attenuation (by turning the input attenuator control clockwise) or increase the input level (by increasing the output level of the device feeding the SX201).

2.2 Know What You Are Listening To

Low frequency boost may increase the level of some frequencies that cannot be heard, for one reason or another. Many high quality microphones are capable of generating substantial output at very low frequencies (below 50Hz) which cannot be adequately reproduced by most monitor speakers or headphones. Be aware that the true effects of low frequency boost may not be audible, and may actually result in a "muddy" or distorted sound.

2.3 Use Wide Peaks, Narrow Notches

In general, the human ear prefers wide bandwidth peaks and narrow bandwidth notches. Boosting a narrow bandwidth produces a sound usually perceived as "offensive," while boosting wider bandwidths (.7 octave or greater) usually results in a sound deemed "musical." It has also been observed that very few people will notice anything's missing when a narrow bandwidth (.3 octave or less) is cut, even when it's cut as much as 30dB. But, cut a wide bandwidth and the resulting sound quality is often called "empty."

2.4 Tuning the EQ/Notch Filter

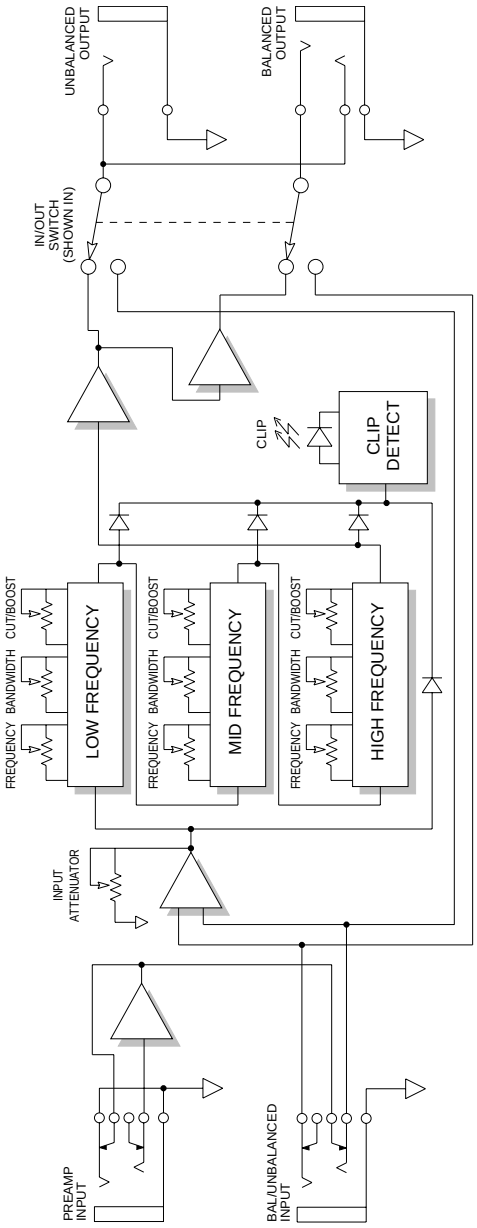
For both boost and cut, the SX201's parametric equalizer/notch filter is intended to be put to work on specific frequencies. To "tune" the equalizer, use full boost to make the frequency easily heard and identified.

To find a particular frequency "by ear" (the method used by everyone who doesn't have a real-time analyzer), turn the cut/boost control all the way up to +15dB (be very careful of feedback if you are listening on a loudspeaker!). Set the bandwidth for about .3 octave. Tune the frequency control until you distinctly hear the part of the sound you wish to control. Then, adjust the cut/boost control for the appropriate amount of change, and readjust the bandwidth control if necessary.

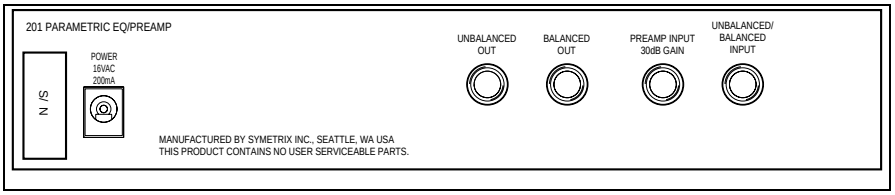
To notch out interference like 60Hz hum, follow the procedure above to get an approximate setting for the frequency control. Then, to fine tune the notch for the best possible rejection of the interference, turn the cut/boost control all the way down to -30dB. Very carefully adjust the frequency control for minimum hum. Then reduce the bandwidth to about .2 octave, and readjust the frequency control for minimum hum. Repeat this process until the narrowest possible bandwidth is achieved.

3. Connections, Controls and Switches

3.1 Block Diagram



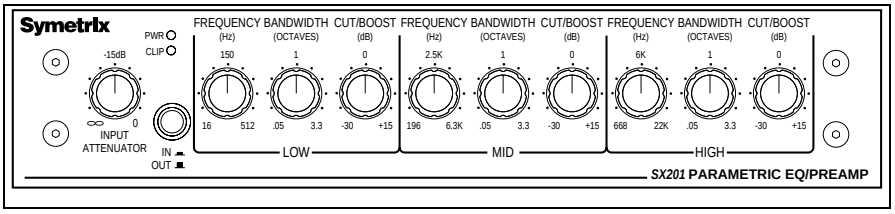
3.2 Rear Panel Connectors



What	Description
POWER	5mm coaxial socket. Use Symetrix PS-2 power supply (16V ac, 500 mA), included with domestic units. The PS-2 is both UL and CSA certified. Accepts plugs with 2.5mm center pin (Switchcraft 760).
OUTPUTS	**Balanced**: 1/4 inch TRS jack, + 24 dBm maximum level. 200-ohm source impedance. (matches all balanced inputs) **Unbalanced**: 1/4 inch TS jack, +18 dBm maximum level. 100-ohm source impedance. (matches all unbalanced inputs)
INPUTS	**Preamp**: 1/4 inch TRS jack, +12 dBu maximum level. Ring connection on jack connected to ground. 20 kilohm input impedance. 30 dB gain. **Balanced/Unbalanced**: 1/4 inch TRS jack, + 18 dBu maximum level. 10 kilohm balanced bridging. Disables preamp input jack.

CAUTION: Do not use any AC adapter other than the Symetrix PS-2. Do not short the outputs. Do not stick your finger(s) into a light socket.

3.3 Front Panel Controls and Switches



What	Description
PWR	Yellow LED indicates power “on”.
CLIP	Red LED fires just before the onset of clipping. To avoid serious distortion, reduce input levels if this indicator flashes.
INPUT ATTENUATOR	Sets input signal strength. Use this control to reduce input levels if the clip LED flashes.
IN/OUT switch	Depressing the switch to the IN position puts the SX201 circuitry in-line. In the out position, the balanced/unbalanced input is hard-wired to the balanced/unbalanced output.
FREQUENCY (HZ)	Sets the center frequency for each section of the equalizer. Each frequency control has a 5-octave range.
BANDWIDTH (OCTAVE)	Sets the range of frequencies that is controlled by the equalizer. Variable from 0.05 (1/20th) of an octave for very narrow notch filter capability, to 3.3 octaves for very broad tone shaping capability.
CUT/BOOST	Sets the amount of cut of boost applied to the frequencies selected with the FREQUENCY and BANDWIDTH controls. Provides up to 30 dB cut for deep notch filtering, and up to 15 dB boost for tone shaping.

4. Troubleshooting

Use the following guide in case of difficulty; preferably before calling the factory for assistance.

Problem	Check/try this
No output	Is the INPUT ATTENUATOR control set too low for the present signal?
	Is the PWR LED lighted?
	Is the PS-2 plugged into a live outlet?
	Is the PS-2 working?
Distortion or Clipping at the Output.	Check signal at input. Is it too high or already distorted?
	Do you have a line-level signal plugged into the PREAMP input jack?
	Check setting of INPUT ATTENUATOR control. Turn the control counter-clockwise until the clip LED turns off?
	Excessive amounts of EQ may cause distortion. Try reducing the setting of the INPUT ATTENUATOR control.
Schematic diagram	Available from the factory.

5. Specifications

Item	Specification
Line Input	active balanced bridging
Impedance	greater than 10 kilohms
Max input level	+18 dBu
CMRR	greater than 40 dB @ 1 kHz
Clip Indicator	red LED, fires 4 dB below clipping
Preamp Input	universal low-Z/high-Z unbalanced
Impedance	greater than 20 kilohms
Maximum input level	-12 dBu
Connector	TRS, wired tip hot, ring and sleeve ground.
Parametric EQ/Notch Filter	
Boost/Cut	+15 dB, -30 dB
Bandwidth	variable, 0.05 octave to 3.3 octaves
Frequency	16 Hz to 22 kHz in three overlapping bands
Range per band	5 octaves
Low band	16 Hz to 512 Hz
Mid band	196 Hz to 6300 Hz
High band	686 Hz to 22 kHz
Output	active balanced/unbalanced
Source impedance	200 ohms balanced 100 ohms unbalanced
Maximum level	+24 dBm into 600 ohms, balanced +18 dBm into 600 ohms, unbalanced
Residual output noise	-92 dBu, 20 kHz bandwidth
Signal to Noise Ratio	101 dB re full output
Distortion (THD +N)	0.025% @ 2 kHz, +18 dBm output

Frequency Response	20 - 20 kHz, +0 / -1 dB
Controls	Input attenuator, Frequency (3), Bandwidth (3), Cut/Boost (3), In/Out switch.
Connectors	All TRS except for unbalanced output (TS). TRS jacks are wired balanced (tip-hot), except for the PREAMP input, which is wired tip-hot, ring+sleve-ground.
Physical	Size: 1.5" H X 8.2" W x 6" D (chassis) 8.5" W x 1.75" H (front panel) Shipping weight: 5 lbs
Power	16V ac, 200 ma. Symetrix PS-2 for 110V ac operation. Symetrix PS-2EP for 220V ac operation.

Accessories

RM-2	Two-unit standard 19" rack mount. (1U tall, holds two SX200 modules side-by-side).
SC-2	Security cover / filler panel.
PS-2	Spare 16V ac power supply.

6. Repair Information

Should you decide to return your SX201 to Symetrix for service, please follow the following instructions.

6.1 Return Authorization

Symetrix will service any of its products for a period of five years from the date of manufacture. However, no goods will be accepted without a Return Authorization number.

Before sending anything to Symetrix, call us for an RA number. just ask, we'll gladly give you one! call (206) 787-3222, weekdays, 8am to 4:30 pm pacific time.

6.2 In-Warranty Repairs

To get your unit repaired under the terms of the warranty:

1. Call us for an RA number.
2. Pack the unit in its original packaging materials.
3. Include your name, address, etc. and a brief statement of the problem. Your daytime telephone number is very useful if we can't duplicate your problem.
4. Put the RA number on the outside of the box.
5. Ship the unit to Symetrix, freight prepaid.

Just do those five things, and repairs made in-warranty will cost you only the one-way freight fee. We'll pay the return freight.

If you choose to send us your product in some sort of flimsy, non-Symetrix packaging, we'll have to charge you for proper shipping materials. We won't return the unit in anything but original Symetrix packaging. Of course, if the problem turns out to be operator inflicted, you'll have to pay for both parts and labor. In any event, if there are charges for the repair costs, you will pay for return freight. All charges will be COD unless you have made other arrangements (prepaid, Visa or Mastercard).

6.3 Out-of-Warranty Repairs

If the warranty period has passed, you'll be billed for all necessary parts, labor, packaging materials, and any applicable freight charges.

Remember, you must call for an RA number before you send the unit to Symetrix.

7. SX201 LIMITED WARRANTY

The Symetrix SX201 is designed and manufactured for use in professional and studio audio systems. Symetrix, Inc., warrants that the SX201 manufactured by Symetrix, when properly installed, used and maintained in accordance with instructions contained in the manufacturer's operator's manual, will perform according to the specifications set forth in the operator's manual.

Symetrix expressly warrants that SX201 will be free from defects in material and workmanship for ninety (90) days. Symetrix' obligations under this warranty will be limited to repairing and replacing, at Symetrix' option, the part or parts of the SX201 which prove defective in material or workmanship within ninety (90) days from the date of purchase, provided that the Buyer gives Symetrix prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after a Return Authorization number (RA) has been obtained from Symetrix and Buyer will prepay all freight charges to return any products to the Symetrix factory. Symetrix reserves the right to inspect any products which may be the subject of any warranty claim before repair or replacement is carried out. Symetrix may, at its option, require proof of the original date of purchase (dated copy of original retail dealer's invoice). Final determination of warranty coverage lies solely with Symetrix. Products repaired under warranty will be returned freight prepaid via United Parcel Service by Symetrix, to any location within the Continental United States. Outside the Continental United States, products will be returned freight collect.

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The Symetrix SX201 is designed and manufactured for use in professional and studio audio systems and is not intended for other usage. With respect to products purchased by consumers for personal, family or household use, Symetrix **EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

This limited warranty, with all terms, conditions, limitations and disclaimers set forth herein, shall extend to the original purchaser and anyone who purchases the product within the specified warranty period.

Warranty Registration must be completed and mailed to Symetrix, Inc. within thirty (30) days of the date of purchase.

Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability or make any additional warranties or representation regarding this product performance on behalf of Symetrix.

This limited warranty gives the buyer certain rights. You may have additional rights provided by applicable law.

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8. Lightbulb Replacement Information

The following information may be useful to you in the event that you have to change a lightbulb.

Q: How many audio engineers does it take to change a lightbulb?

1. What's a lightbulb?
2. It's in the manual. Didn't you **read** the manual?
3. One, so long as he replaces it with an oxygen-free bulb.
4. Uh...first we have to decide if the bulb is wired base-hot or thread-hot.
5. If you just turn the other dimmers down a bit, the client won't even notice that the bulb has gone out.
6. None. Since it's analog, leave it broken and replace it with the latest digital bulb from Symetrix.
7. First the decision as to whether the bulb should be changed: it takes four people at the minimum. One person must have excellent communication skills and will present a paper on the subject for consideration by the AES. The other three persons set up numerous blind looking tests to determine whether or not anyone really will notice the bulb's state as significant. Passing that part of the process, it may be necessary to select the proper replacement. The "1 or 10" rule applies here. Either the engineer is experienced enough to select the reight bulb for the job, or it may require 10 engineers to discuss the various options available. No fewer than three of these people will then review products suitable for the trade magazines while four others present discussions of the subject to such venues as regional AES section meetings and rec.audio.pro (audio discussion group on the Internet). The remaining three indulge in Internet flame wars blasting the reviews of the first three.

   Ideally, a side by side comparison of bulbs will take place. One must consider spectral emissions and footcandle data, measuring all to confirm manufacturer's claims. The type of gas filling the glass bulb and material used for the filament can influence the quality of lamp performance, and the psychological effects of color distribution can...

   What was the question again? (Remember that it only took 20+ years to decide that pin 2 was hot!)